THE EFFECTS OF RURAL HIGH SCHOOL ON ATTENDING COLLEGE AND EARNING A BACHELOR'S DEGREE? A MULTIVARIATE LONGITUDINAL ANALYSIS OF A NATIONAL COHORT OF HIGH SCHOOL SENIORS

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Abstract

The Effects of Rural High School on Attending College and Earning a Bachelor's Degree? A Multivariate Longitudinal Analysis of a National Cohort of High School Seniors

This study examines the effects of attending a rural high school on postsecondary education outcomes. Besides rural high school attendance, other school, family, and individual characteristics are examined to determine if they moderate the effects of high school location upon entering a four-year college or not and graduating with a B.A. degree or higher. Using data for the 1992 cohort of high school seniors gleaned from the National Educational Longitudinal Survey (NELS 88/2000), the results indicate that the long-term effects of receiving a rural high school education are not as detrimental as some previous research has suggested. The disadvantages of attending a rural high school can be overcome when families and students can marshal resources and make investments for post-secondary educational success.

Introduction

A general perception is that rural schools provide students with an inferior level of education compared to schools in suburban and urban areas. It has been argued that resource disparities at the economic level in rural societies have negative effects upon family and school investments (Roscigno and Crowley 2001). Family income and parental education are typically higher in urban areas; thus, a disproportionate share of U.S. families with limited education and incomes below the poverty line are found in rural areas. Consequently, students in rural areas are disadvantaged in several respects; their families have lower incomes on average, their parents are less likely to have attended college, and their parents are less inclined to encourage high educational attainment. Examining the effect that place of residence has upon the likelihood of college attendance reveals that rural students are significantly less likely to attend college than are suburban and urban students (Smith et al. 1995).

On the other hand, a recent study presents valuable evidence that rural school students may not be at an institutional disadvantage (Fan and Chen 1999). Achievement test scores in the subjects of reading, math, science, and social studies were taken from a nationally representative sample of students. After controlling for mitigating factors, the study concluded that students from rural schools performed as well as their peers in metropolitan areas in the four areas of school learning: reading, math, science, and social studies. This reflects some previous research stating that rural school students are not at a general disadvantage compared to their urban counterparts (Haller et al. 1993).

This study seeks to determine whether students attending rural high schools are in fact at an educational disadvantage at the postsecondary level. Two postsecondary outcomes will be considered: four-year college attendance and receiving a B.A. degree or higher. This focus is important because receiving an inferior high school education can have numerous life-long effects. A disadvantaged education can lower a student's potential for college entrance and attainment (Smith et al. 1995). Not attending college has been associated with lower economic success compared to students who attend college. Specifically, an inferior education can leave students unprepared to enter the competitive labor market, which results in decreased future income and occupational status (Bowles and Gintis 2002, p.1).

Along with comparing rural versus urban educational differences, this study also seeks to extend the literature by considering the effects that rurality has upon college attainment. Most previous research has focused primarily on the effects that rurality has upon high school achievement (Fan and Chen 1999; Khattri et al.1997; Roscigno and Crowley 2001; Rumberger and Thomas 2000). The effect that rurality has upon college completion is a far less explored area that may produce significant results for assessing the effectiveness of rural versus urban schools (Kindell 2003). It is important to examine the effects of rurality upon college attainment instead of limiting the focus to high school achievement alone.

Previous Research

Several major factors have been widely cited as contributing to the differences in students' academic outcomes. These include school resources and investments, family resources and investments, and characteristics that differentiate between individual students.

Following the practice of Roscigno and Crowley (2001) school and family characteristics can be conceptualized by differentiating between resources and investments. Resources are comprised of intrinsic variables that constitute an advantaged or disadvantaged educational status. On the other hand, investments can be classified as conscious, active decisions that are made to improve educational outcomes.

School Resources

School resources, such as the makeup of the student body, can play an active role in discouraging students from attending college. First, a high school that has a high percentage of students receiving free or reduced lunch is an indicator of low SES among the student body. A previous study found that schools with a high percentage of students receiving free or reduced lunch is associated with a significant decline in standardized math achievement scores (Roscigno and Crowley 2001). Second, attending a school with a high percentage of students from single parent homes has been shown to have negative effects on academic success. Specifically, schools in which 50% or more of the student population is from single parent homes exhibit a much lower performance in math and reading achievement (Pong 1998). Considering the fact that urban schools are more likely to have higher proportions of students from single parent homes, this may have a negative effect on students attending urban high schools (Khattri et al. 1997). Another interesting finding related to school resources is that having a higher proportion of white and Asian students in a particular school increases the educational achievement of every other racial group in that school (Coleman et al. 1966).

The behavioral aspect of students can have a discouraging effect on student's ability to perform well in school. High rates of alcohol and drug abuse, teenage pregnancy, and absenteeism are all associated with academic failure. In fact, Khattri and colleagues note that "student absenteeism from classes is a factor strongly associated with low educational attainment and dropping out of school, and is often considered to be one of the most serious problems teachers must address" (1997, p.88).

School Investments

Whether a school is private or public has been shown to produce significant educational achievement outcomes. For instance, one notable study by Coleman (1990) found evidence of higher academic achievement in basic cognitive skills (reading comprehension, vocabulary, and mathematics) in Catholic schools than in public schools for students from comparable family backgrounds. Additional studies have found that the positive effects of Catholic schools upon educational achievement, especially in mathematics, is most likely due to more homework and an increased emphasis placed upon advanced mathematics courses (Lee et al. 1998; Sander 2001). Catholic school students typically perform better in math despite the fact that Catholic school funding is less than that received by public schools.

Schools that fail to invest in educational technology exhibit lower levels of educational success (Elliot 1998). Investments in advanced curriculum and classroom technology, such as computers and science labs, provide students with important educational resources. For instance, the availability of advanced placement courses is shown to be a powerful predictor of academic achievement and college enrollment (Khattri et al. 1997).

Family Resources

Socioeconomic status (SES), which is typically measured by family income or parental education level, has been repeatedly shown to affect a student's educational success (Israel et al. 2001; Roscigno and Crowley 2001; Teachman et al.1997). Since income can be especially depressed in rural areas, this can have a negative effect upon a child's educational achievement (Smith et al.1995). Lack of financial resources prevents parents from sending their children to expensive private schools and elite universities that typically produce higher achieving students (Coleman 1990). In addition, the low SES of rural families may prevent them from having educational resources available in the home. A lack of educational resources in the home, such as a newspaper, encyclopedia, computer, and place to study, is significantly related to lower levels of academic achievement (Roscigno and Crowley 2001).

Another aspect of a family's socio-economic status, parental education, can affect a child's educational success. A recent study sought to determine the relationship between a parent's education level and their child's math/reading composite test score, grade point average, and whether or not the child stayed in school. The results concluded that children whose mother or father attended college scored higher on all three measures (Israel et al. 2001). Consequently, having a parent with a high level of education significantly affects a child's educational success. Researchers argue that parents with high levels of education may keep track of their child's education more closely than parents with less education (Brown and Hirschl 1995). Thus, parental education has been shown to have a positive effect upon children staying in school and achieving higher academic tests scores.

An aspect of family structure that affects educational achievement is the number of siblings that a child has. For instance, as the number of siblings increases, so does the likelihood that the child will drop out of school (Coleman 1988; Teachman et al. 1997). It is hypothesized that this relationship exists because a larger family will require a family to have less financial resources to spend on each child. As noted earlier, a lower family income results in educational disadvantages for children. Furthermore, having more siblings reduces the amount of interaction time that parents are able to have with each child, which can also adversely affect educational performance (Coleman 1988).

Family Investments

Investments for a child's education have been shown to keep students from dropping out of high school as well as encouraging them to attend college. For instance, parental expectations have a significant effect on their child's academic success (Teachman et al. 1997). Parents who have high expectations and 'set standards' for their child's success, tend to produce higher achieving students (Alexander et al. 1997; Israel et al. 2001). In addition, cultural capital investments seem to be positively associated with a student's academic achievement. In a recent study, (Aschaffenburg and Mass 1997) cultural capital was operationalized by how often parents exposed their children to various cultural activities: such as listening to classical music, visiting museums, attending classical performances, and reading books not required by school or church. The authors concluded that cultural capital investments are positively and significantly related to a student's likelihood of entering and completing college.

Individual Characteristics

Not all factors that bear upon academic success can be attributed to school resources and investments or family resources and investments. For instance, course taking behavior and standardized test scores are personal factors that can influence college attendance. A recent study by Adelman (1999) found that students who completed more academically intensive coursework in high school were more likely to complete college. Specifically, taking more math and science courses in high school translated into greater academic success at the postsecondary level.

Past research has consistently shown that changing schools has harmful effects in terms of education (Alexander et al. 1997; Coleman 1990; Israel et al. 2001; Teachman 1997). This is most likely due to the fact that changing schools prevents students from becoming integrated into a stable learning environment.

Religion is an interesting individual characteristic that may have an effect on educational attainment since religious groups defined as 'conservative' may be opposed to the teaching of evolution in college science courses (Darnell and Sherkat 1997). This may prevent students from conservative religious backgrounds from taking college science courses and may even reduce the chances of them attending college at all. The results of Darnell and Sherkat's study reveal that religious belief can act as a form of negative cultural capital. Conservative Protestants have significantly lower educational aspirations than other respondents (Darnell and Sherkat 1997). Furthermore, after controlling for the effects of social background, Conservative Protestants are less likely to enroll in college preparatory classes and have significantly lower levels of educational attainment than do members of

other religions. Thus, religious affiliation may play an important role in decreasing the likelihood of entering college. In addition, church attendance has been shown to have a positive effect on entering college, especially among students from rural areas (Smith et al. 1995).

Individual participation in various extracurricular programs, such as club involvement and sports participation, may influence academic achievement. In a study of the effects of sports and club involvement on dropping out of high school, McNeal (1995) found that with family background factors held constant, students who participated in athletics were an estimated 1.7 times less likely to drop out of high school and students who participated in art clubs were 1.2 times less likely to drop out of high school. Since sports and clubs seem to integrate students into their high school academically, it may also have an effect on whether or not students attend postsecondary institutions.

Race and gender are two important individual characteristics that are likely to have an impact upon college entrance and attainment. Numerous studies have concluded that members of disadvantaged minority races, such as African-Americans, Hispanics, and Native Americans, perform lower on standardized achievement tests than do White and Asian students (Coleman et al. 1966; Israel et al. 2001; Khattri et al. 1997; Roscigno and Crowley 2001). Gender also has an effect upon academic attainment with males being less likely to finish high school than their female counterparts (Alexander et al. 1997). Female high school students are also more likely to score higher on math and reading achievement tests and produce higher grades than males (Israel et al. 2001; Roscigno and Crowley 2001).

To sum up, the previous research on educational achievement/attainment leads to the conclusion that academic performance is influenced by three different classes of factors: family, school, and individual characteristics. The proposed impact of rurality upon educational attainment in the present study resembles the conceptual model proposed by Roscigno and Crowley (2001). Roscigno and Crowley believe that rurality influences family and school resources and investments, which in turn affect high school achievement. The major difference between their conceptual model and that proposed in the present study is the outcome of rurality's effects upon academic success. This study proposes that attending a rural high school will influence the likelihood of a student entering a four-year college and of graduating from college. Furthermore, this study will focus on how the effect of attending a rural high school is mediated by school, family, and individual characteristics.

Data and Method

Data

This analysis is based on data gleaned from the National Educational Longitudinal Study (NELS 88/2000). NELS is a nationally representative sample of secondary school students that were surveyed starting in 1988. (The original data gathering was performed by the National Opinion Research Center at the University of Chicago, under the supervision of the National Center for Educational Statistics, U.S. Department of Education.) NELS is highly regarded by researchers for its comprehensiveness. Many of the studies cited above have used NELS data. In most cases, data for the present study were taken from the second follow-up wave in 1992 (12^{th} grade) and the fourth wave in 2000 (8 years after graduation).

A description of each of the variables used in this study and its source(s) in NELS has been included in the Appendix. Missing values for all independent variables except for 'female' have been recoded with the mean value.

Dependent Variables

The effects of attending a rural high school will be determined by using two educational outcome variables: entering a four-year college and completing college with at least a Bachelor's degree. In the 2000 follow-up wave of NELS, respondents were asked if they have ever attended a postsecondary institution after high school. Responses have been recoded into a dummy variable indicating ever attended a four-year college institution (1=yes, 0=no). The 2000 follow-up wave also asked each respondent what was the highest level of post-secondary education they had completed. Respondents who obtained a Bachelor's degree or higher were coded 1; those who hadn't were coded 0.

The cross-tabulations in Table 1 display the percentage of high school seniors who ever attended a four-year institution and graduated with a B.A. degree. In regards to the first postsecondary outcome, 55.5% of the high school students included in this study attended a four-year college. While nearly 60% of students from non-rural high schools attended a four-year college, only 47% of students from rural high schools attended. While over half of the students in this study attended college, only 35% of the cohort graduated with a B.A. degree or higher. Just as a higher percentage of students from non-rural high schools have attended a four-year college, a higher percentage of students from non-rural high schools graduated with at least a B.A. degree. While approximately 39% of students from non-rural high schools completed college with a B.A. degree, only 27% of students from rural high

Table 1. **Percent of High School Seniors Ever Attending A Four-Year College and Graduating with at Least a B.A. Degree, and Majoring in Science or Math.**

	Total	Rural	Non-Rural	N
Ever Attended 4 Year Institution	55.5	46.8	59.5	11587
B.A. Degree or Higher	35.1	26.7	38.9	11488

schools accomplished such a feat. On the whole, these simple tabulations support the idea that rural high school seniors experience reduced postsecondary educational opportunities. The purpose of this study will be to examine a number of other variables that may help to explain these patterns.

Independent Variables

Table 2 presents the descriptive statistics for the school, family, and individual characteristics included in the present study. Additionally, Table 2 provides the descriptive statistics broken down by rural and non-rural high schools.

Rural High School Attendance. The NELS dataset classifies schools as urban, suburban, or rural based on the location of each student's school in the second follow-up wave. In an effort to simplify this measure of attending a rural high school, the variable was made dichotomous by combining urban and suburban school districts. After excluding missing cases, urban and suburban high school seniors make up 69% of the sample, with rural high school seniors comprising the remaining 31%.

School Characteristics. Numerous characteristics of schools are indicative of the quality of its resources, and thus are likely to affect the academic performance of students. First, each twelfth grade student's school has been classified as either public=0 or private=1. In order to examine the effects of a school's racial population upon academic attainment the percentage of 'disadvantaged races,' such as African-Americans, Hispanics, and American Indians, in each school are recorded. In addition, the socioeconomic status of each high school student body is ascertained by recording the percentage of students receiving free or reduced lunch. Next, given the findings in previous research that students from single-parent

Table 2. Descriptive Statistics for the Predictor Variables.

Variable	Total Mean	S.D.
Rural High School Attendance	0.31	0.46
School Characteristics		
Private school	0.12	0.33
% Disadvantaged Minority	22.04	25.01
% Free/Reduced Lunch	20.49	18.88
% Single Parent Homes	2.53	0.74
% Enrolled in AP Courses	21.99	17.88
% Enrolled in College Prep	50.8	24.74
% College Enrolled	4.23	0.94
School Climate	3.20	0.36
Daily Attendance Rate	92.78	4.80
Family Characteristics		
Total Income	10.17	2.38
Parental Education	3.04	1.11
Parental Expectations	3.99	1.06
Home Ed. Resources	4.45	1.06
Cultural Capital	2.53	0.93
# Siblings	1.61	1.13
Individual Characteristics		
Cumulative GPA	14.16	23.71
# School Changes	0.19	0.53
Science Units	2.82	1.09
Math Units	0.43	0.67
Standardized Science	51.22	8.69
Standardized Math	51.57	8.76
Sports Involvement	0.56	0.66
Club Involvement	1.94	1.56
Extracurricular Hours	2.05	1.69
Is R Religious?	1.88	0.59
Church Attendance	3.65	1.58
Disadvantaged Race	0.24	0.43
Female	1.52	0.50

N= 11542

Table 2 (cont.). Descriptive Statistics for the Predictor Variables.

Variable	Rural Mean	S.D.	Non-Rural Mean	S.D.
School Characteristics				
Private school	0.02	0.14	0.17	0.38
% Disadvantaged Minority	17.22	21.81	24.26	26.05
% Free/Reduced Lunch	26.18	18.61	17.87	18.43
% Single Parent Homes	2.54	0.69	2.52	0.75
% Enrolled in AP Courses	16.45	15.38	24.53	18.37
% Enrolled in College Prep	44.15	19.03	53.85	26.41
% College Enrolled	3.96	0.81	4.36	0.96
School Climate	3.23	0.33	3.19	0.37
Daily Attendance Rate	92.93	4.92	92.71	4.74
Family Characteristics				
Total Income	9.67	2.34	10.40	2.37
Parental Education	2.80	1.01	3.15	1.14
Parental Expectations	3.77	1.17	4.10	0.99
Home Ed. Resources	4.32	1.03	4.51	1.07
Cultural Capital	2.47	0.96	2.56	0.92
# Siblings	1.57	1.14	1.62	1.12
Individual Characteristics				
Cumulative GPA	13.45	23.25	14.48	23.92
# School Changes	0.17	0.49	0.20	0.54
Science Units	2.73	1.11	2.86	1.08
Math Units	0.30	0.55	0.49	0.71
Standardized Science	50.51	8.68	51.55	8.68
Standardized Math	50.35	8.71	52.12	8.73
Sports Involvement	0.58	0.68	0.55	0.65
Club Involvement	1.99	1.57	1.92	1.56
Extracurricular Hours	2.01	1.64	2.08	1.71
Is R Religious?	1.90	0.57	1.88	0.60
Church Attendance	3.59	1.58	3.68	1.58
Disadvantaged Race	0.19	0.39	0.26	0.44
Female	1.53	0.50	1.52	0.50
N	3633		7909	

families exhibit lower levels of achievement, the percentage of students in single-parent families from each high school will serve as a school resource variable.

To delve more deeply into the high school learning environment, an index was created to identify the presence and amount of behavioral problems in each school. Thus, 'school climate' is a four point scale that identifies the seriousness of behavioral problems ranging from a score of 1= serious to 4=not a problem. Behavioral problems included in this index are: tardiness, absenteeism, class cutting, physical conflicts, gang activity, robbery or theft, vandalism, use of alcohol or illegal drugs, drunk/high at school, sale of drugs near school, possession of weapons, physical or verbal abuse of teachers, racial/ethnic conflict, and teen pregnancy. In an effort to test the effect of absenteeism upon educational attainment, the variable 'Daily School Attendance' is utilized to indicate a school's average daily attendance rate.

Several indicators of school investment will be analyzed in order to determine their effect upon college enrollment and college completion. Given previous research arguing that rural schools are likely to be underfunded and less able to offer AP and college-prep courses when compared to urban schools, the percentage of students attending a four-year college may be considerably lower for rural high school graduates (Khattri et al. 1997; Roscigno and Crowley 2001). Thus, the percentage of students enrolled in advanced placement (AP) courses and the percentage of students taking college prep courses will be included as measures of school investment. Additionally, the second follow-up wave, which took place in 1992, recorded the percentage of 1990-1991 graduates who were then attending a four-year college.

Family Characteristics. Socioeconomic status (SES) is operationalized by utilizing two traditional measures, family income and parental education. Income is the total family income from all sources in 1991. Income is rated on a categorical scale that ranges from 1 to 15. Parental education is measured using an ordinal scale, with 1=Didn't finish high school to 5=M.A. or higher.

Additional measures of family resources are number of siblings and home resources. A variable indicating number of siblings living with the respondent in the base year (8^{th} grade) will be included in the analysis. 'Home resources' is an index created to determine the amount of educational resources in the respondent's home ranging from 1 to 6. Educational resources include: a place to study, an encyclopedia, a dictionary, a computer, more than 50 books, and a calculator.

The family investment variables included in this study are parental expectations and cultural capital. This study will examine whether parental expectations significantly increase their children's chances of entering and completing college. Answers will range from 1= high school degree or less to 5=M.A. or higher. 'Cultural capital' is an ordinal measure of how often parents attended concerts, plays, and movies with their teen in the last year. This is measured ordinally on a four point scale 1=never; 2=rarely; 3=sometimes; 4=frequently.

Individual Characteristics. Each individual student may possess personal resources that are not accounted for by family or school characteristics. For instance, each student's cumulative grade point average for their twelfth grade year is recorded in the variable 'GPA.' As proposed by Adelman (1999) the number of units taken in high school math and science

may make a student significantly more likely to finish college. Consequently, 'science units' will measure the total number of science units taken during high school, and 'math units' will sum the number of units taken in trigonometry, pre-calculus, and calculus. Each student's twelfth grade standardized science and math scores will also be included as a measure of individual achievement.

A variable is included to indicate the number of times that the twelfth grade respondent has changed schools in the last four years. It is hypothesized that changing schools will most likely have a negative effect upon college entrance and graduation (Coleman 1990; Israel et al. 2001; Smith et al. 1995; Teachman 1997).

In this study sports involvement is transformed into a dummy variable in which students who participated in an individual sport, team sport, or in cheerleading are coded 1; students who didn't participated in any of these activities are coded 0. The variable 'clubs' is the sum of all other school activities and clubs in which the student participated with values ranging from 0 to 11. The amount of hours per week spent on extracurricular activities is captured in the variable 'extracurricular time.'

Considering the evidence in Darnell and Sherkat's (1997) study that conservative religious affiliation may deter students from entering college, several religion-related variables will be included in the present study. A suitable measure of religious conservatism could not be obtained from NELS. Thus, in this study a broader hypothesis is tested: does religiosity generally influence college outcomes? Each respondent was asked if he or she thinks of themselves as a religious person, ranging on a three point scale 1= No;

2=Somewhat; 3=Very. In addition, a variable will be included indicating how many times each student attended church services in the past year.

Race and gender are also likely to affect the odds of a student entering and completing college (Alexander et al. 1997; Coleman 1966; Israel et al. 2001; Trusty 1997). Consequently, respondents belonging to a disadvantaged race (African-Americans, Hispanics, and Native Americans) were coded 1, while those belonging to a more advantaged race (Asians and Non-Hispanic Whites) were coded 0. Each respondent will also be classified by gender, with males coded as 1 and females coded as 2.

Method of Analysis

Commonly used multivariate techniques, such as multiple regression analysis, can be used to predict a continuous dependent variable with a set of independent variables. However, when performing statistical analyses with a dichotomous dependent variable, such as whether a student attends college or not, or graduates from college or not, the normality assumptions of ordinary least squares regression are violated. Logistic regression is best suited for predicting the presence or absence of an outcome based on a set of predictor variables. This is accomplished by estimating log odds ratios for each of the independent variables in the model and testing their significance. Logistic regression is the procedure chosen for this study.

The logistic regression analysis will begin by first examining the effects of the predictor variables (rural high school attendance, plus school, family, and individual characteristics) upon each of the two educational outcome variables. In the description of the results which follows, Table 3 will report the effects of the predictor variables upon whether

or not a student attends a four-year college. Table 4 presents the effects of the predictor variables upon whether or not a student earns at least a Bachelor's degree. Each of these tables will begin by examining the sole effect of attending a rural high school upon the dependent variable (Model 1). Then the second model will present the combined effects of rural high school attendance along with other school characteristics. The third model will display the effects of attending a rural high school and family characteristics, and the fourth model will report the effects of rural high school and individual characteristics. Finally, a full model will display the effects of all of the predictor variables upon the dependent variable. This multistage logistic regression analysis permits the assessment whether attending a rural high school has a largely direct or indirect effect, both types of effects, or no effect.

The analysis will then conclude with a final table, Table 5, which will compare the effects of the predictor variables by separating the rural sample of high school seniors from the non-rural sample. This will allow us to explore whether the school, family, and individual characteristics have more of an effect on rural high school seniors than on non-rural seniors.

Results

What Predicts Attending a Four-Year College?

Table 3 begins by showing the effect of rural high school attendance upon whether or not a student will ever attend a four-year college. Students who attend a rural high school are significantly less likely ever to attend college, although rural high school attendance explains only 1.9% of the variation in the likelihood of college attendance. When school

Table 3. Logistic Regression Models: Predictors of Ever Attended a Four-Year College.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	.391(.023) ***	-1.150(.451)	-.544(.258) ***	-6.726(.269) ***	-10.337(.698) ***
Rural High School Attendance	-.516(.040) ***	-.193(.045) ***	-.082(.049)	-.452(.052) ***	-.053(.060)
School Characteristics					
Private school	.	1.261(.095) ***	.	.	.656(.118) ***
% Disadvantaged Minority	.	-.002(.001)	.	.	.002(.001)
% Free/Reduced Lunch	.	-.005(.001) ***	.	.	.001(.002)
% Single Parent Homes	.	-.055(.030)	.	.	.004(.038)
% Enrolled in AP Courses	.	.004(.001) ***	.	.	.000(.002)
% Enrolled in College Prep	.	.003(.001) **	.	.	.001(.001)
% College Enrolled	.	.309(.027) ***	.	.	.238(.036) ***
School Climate	.	-.031(.064)	.	.	.074(.082)
Daily Attendence Rate	.	.002(.004)	.	.	-.002(.006)
Family Characteristics					
Total Income	.	.	.130(.012) ***	.	.065(.013) ***
Parental Education					
HS Grad or GED	.	.	.470(.095) ***	.	.278(.107) **
Some College	.	.	.749(.087) ***	.	.452(.099) ***
College Grad	.	.	1.639(.109) ***	.	1.038(.125) ***
M.A. or Higher	.	.	2.241(.131) ***	.	1.434(.149) ***
Parental Expectations					
Votech/Business School	.	.	.336(.231)	.	.523(.249) *
Some College	.	.	1.311(.225) ***	.	1.286(.243) ***
College Grad	.	.	2.612(.209) ***	.	2.202(.226) ***
M.A. or Higher	.	.	3.276(.210) ***	.	2.633(.229) ***
Home Ed. Resources	.	.	.211(.023) ***	.	.121(.026) ***
Cultural Capital	.	.	.029(.025)	.	.001(.029)
# Siblings	.	.	-.006(.020)	.	-.030(.023)
Individual Characteristics					
Cumulative GPA	.	.	.	.002(.001)	.001(.001)
# School Changes	.	.	.	-.323(.045) ***	-.397(.050) ***
Science Units	.	.	.	.731(.030) ***	.577(.032) ***
Math Units	.	.	.	.939(.065) ***	.748(.070) ***
Standardized Science	.	.	.	.006(.004)	-.001(.005)
Standardized Math	.	.	.	.074(.005) ***	.059(.005) ***
Sports Involvement	.	.	.	.114(.044) **	.061(.047)
Club Involvement	.	.	.	.139(.018) ***	.118(.019) ***
Extracurricular Hours	.	.	.	.162(.017) ***	.140(.019) ***
Is R Religious?	.	.	.	.090(.051)	.124(.056) *
Church Attendence	.	.	.	-.074(.019) ***	-.027(.021)
Disadvantaged Race	.	.	.	-.167(.056) **	-.131(.071)
Female	.	.	.	.210(.049) ***	.187(.054) ***
Model X^2 (df)	163.81(1) ***	1199.30(10) ***	4053.49(13) ***	5073.93(14) ***	6436.40(35) ***
Nagelkerke R^2	0.019	0.132	0.397	0.476	0.572
N	11542	11542	11542	11542	11542

Log-Odds Coefficients (Standard Error); *p<.05, **p<.01, ***p<.001

characteristics are added in Model 2, the effect of rural high school is decreased, but remains strongly significant. In regards to specific school characteristics, several have a noticeable effect upon college attendance. Attending a private school and a high school where enrollment in college prep and AP courses is greater than the national average significantly increases the odds that a student will attend college. On the contrary, if a greater than average percentage of students are receiving free/reduced lunch, then a student attending such a high school is less likely to go to college. The effects of school characteristics and rural high school attendance jointly explain 13.2% of the variation in the likelihood of college attendance.

Model 3 examines the effects of family characteristics along with rural high school attendance. Although attending a rural high school is still a negative predictor of college attendance, it is no longer significant. In fact, the effect of attending a rural high school declines 84.1% when family characteristics are taken into account. Most all of the family characteristic variables are significant at the .001 level. Total income, parental education, parental expectations, and educational resources in the home, are all positive predictors of entering a four-year college. Also of interest is the fact that the effect of parental education increases steadily as the parent's education level increases. The effects of family characteristics and rural high school jointly explain nearly 40% of the variation in the likelihood of attending a four-year college.

Model 4 displays the effect of attending a rural high school and individual characteristics upon ever attending a four-year institution. Here the effect of attending a rural high school is again significant at the .001 level. Personal characteristics are important in

determining who will attend college. Changing high schools has the effect of making students less likely to attend. More science and math units taken and higher math and standardized science scores, each increase the likelihood of attending college. Involvement in high school sports and clubs and the amount of hours spent on extracurricular activities also raise a student's chances of entering college. Religion has a mixed effect. Although religiosity fails to reach significance, students who have a higher than average rate of church attendance are less likely to enter college. Members of disadvantaged races (African-Americans, Hispanics, and Native Americans) are less likely to attend college than are members of privileged races. Females are more likely to attend a four-year college than are males. On the whole, personal characteristics have a strong effect on predicting college enrollment. Individual characteristics and high school attendance together have a sizeable R-square value of .476.

Model 5 represents the full model, which consists of rural high school attendance along with school, family, and individual characteristics. Rural high school attendance is not a significant predictor of college attendance, and all but two of the school characteristics drop out of significance in the full model. Students hailing from private high schools are still more likely to enter college; however, the strength of the coefficient drops by half in the full model compared to the coefficient in model 2. Additionally, attending a high school with a higher than average percentage of students enrolled in college prep increases a student's likelihood of attending college.

Family characteristics appear to be nearly as strong in Model 5 as they were in Model 3. In fact, every family variable that was significant in model 3 retains its significance in the

full model. Thus, income, parental education, parental expectations, and home educational resources all significantly increase the likelihood of attending a four-year college.

Many of the individual variables that were important in model 4 retain their significance in the full model. For instance, math and science units and standardized math scores are still positive predictors of college entrance. Changing high schools continues to have a significantly negative effect upon attending a four-year college, while being female retains its positive effect. Club involvement and extracurricular hours remain positive predictors, but involvement in sports fails to reach significance in the full model. Interestingly, the effects of religion are reversed when all variables are included in the full model. Whereas church attendance significantly decreased the odds of attending college in Model 4, it fails to have a significant effect when all variables are included in the analysis. Furthermore, whereas strength of religiosity had no effect in Model 4, the full model indicates that students who identify themselves as very religious are significantly more likely to attend college than are less religious students. When all variables are taken into account, race has no significant effect on college attendance. In conclusion, attending a rural high school, along with a number of school, family, and individual characteristics explain over 57% of the variation in the dependent variable. The largest effects are due to family factors and individual accomplishments.

What Predicts Receiving a Bachelor's Degree?

Table 4 displays logistic regression results of the predictors upon the graduation from college with at least a Bachelor's degree. Just as attending a rural high school decreases the chances of entering college, it also significantly decreases the chances of completing college;

Table 4. Logistic Regression Models: Predictors of Graduated with a Bachelor's Degree or Higher.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	-.448(.023) ***	-2.240(.503) ***	-7.087(.451) ***	-8.085(.294) ***	-12.239(.847) ***
Rural High School Attendance	-.557(.044) ***	-.209(.050) ***	-.105(.052) *	-.563(.056) ***	-.155(.065) *
School Characteristics					
Private school	.	.785(.078) ***	.	.	.284(.097) **
% Disadvantaged Minority	.	-.006(.001) ***	.	.	.000(.002)
% Free/Reduced Lunch	.	-.007(.002) ***	.	.	.001(.002)
% Single Parent Homes	.	-.117(.032) ***	.	.	-.060(.039)
% Enrolled in AP Courses	.	.006(.001) ***	.	.	.001(.002)
% Enrolled in College Prep	.	.005(.001) ***	.	.	.003(.001) *
% College Enrolled	.	.303(.029) ***	.	.	.160(.036) ***
School Climate	.	.021(.070)	.	.	.182(.086) *
Daily Attendence Rate	.	.004(.005)	.	.	.001(.006)
Family Characteristics					
Total Income	.	.	.162(.013) ***	.	.089(.015) ***
Parental Education					
HS Grad or GED	.	.	.524(.127) ***	.	.181(.142)
Some College	.	.	.788(.118) ***	.	.345(.132) **
College Grad	.	.	1.594(.129) ***	.	.833(.146) ***
M.A. or Higher	.	.	2.068(.136) ***	.	1.186(.155) ***
Parental Expectations					
Votech/Business School	.	.	-.104(.481)	.	.111(.510)
Some College	.	.	1.146(.442) **	.	1.117(.472) *
College Grad	.	.	3.014(.415) ***	.	2.556(.445) ***
M.A. or Higher	.	.	3.612(.415) ***	.	2.842(.446) ***
Home Ed. Resources	.	.	.157(.024) ***	.	.056(.029) *
Cultural Capital	.	.	.048(.026)	.	.007(.030)
# Siblings	.	.	-.025(.021)	.	-.055(.025) *
Individual Characteristics					
Cumulative GPA	.	.	.	.001(.001)	-.001(.001)
# School Changes	.	.	.	-.288(.056) ***	-.330(.061) ***
Science Units	.	.	.	.591(.030) ***	.476(.032) ***
Math Units	.	.	.	.705(.047) ***	.570(.050) ***
Standardized Science	.	.	.	.001(.005)	-.007(.005)
Standardized Math	.	.	.	.078(.005) ***	.061(.006) ***
Sports Involvement	.	.	.	.173(.043) ***	.118(.046) **
Club Involvement	.	.	.	.148(.017) ***	.132(.018) ***
Extracurricular Hours	.	.	.	.143(.018) ***	.115(.019) ***
Is R Religious?	.	.	.	.195(.053) ***	.242(.056) ***
Church Attendence	.	.	.	-.070(.020) ***	-.030(.021)
Disadvantaged Race	.	.	.	-.548(.065) ***	-.373(.080) ***
Female	.	.	.	.481(.052) ***	.503(.057) ***
Model X^2 (df)	164.871(1) ***	1406.462(10) ***	3656.245(13) ***	4823.890(14) ***	5959.360(35) ***
Nagelkerke R^2	0.020	0.159	0.376	0.473	0.559
N	11443	11443	11443	11443	11443

Log-Odds Coefficients (Standard Error); *p<.05, **p<.01, ***p<.001

and rural high school attendance explains just 2% of the variation in the likelihood of obtaining a Bachelor's or higher degree. Part of this disparity between rural and non-rural college completion can be explained by differences in schools. In Model 2, once school factors are introduced, the negative impact of rural high school attendance decreases by nearly two-thirds, although it remains a very significant negative effect. Additionally, school factors including rural high school explain 15.9% of the variation in whether or not students obtain a B.A. degree. Attending a high school where enrollment in AP courses, percent college enrolled, and enrollment in college prep classes are greater than the national average increases the odds that a student from such a high school will complete college. Attending a private high school also offers an advantage in regards to completing college. On the contrary, if a greater than average percentage of students are from single-parent homes or are receiving free/reduced lunch, then a student attending such a high school is less likely to obtain a B.A. degree. Students who attend high schools with a high percentage of disadvantaged minorities are also less likely to earn a college degree.

In Model 3 the introduction of family factors greatly reduces the difference in college attainment between rural and non-rural students. The effect of rurality plummets 81.2% when family characteristics are taken into account. The effects of family variables have an R-square value (37.6%), which more than doubles the R-square of the school variables (15.9%). Family income and home educational resources both positively increase the likelihood of finishing college. Having educated parents is also beneficial to a student's college attainment. As parental education level increases, so does the likelihood that their

child will graduate from college with a B.A. or higher. For the most part, parental expectations significantly increase the likelihood that their child will finish college.

Model 4 shows the effects of attending a rural high school and individual characteristics. This model reveals a strong negative relationship between rural high school attendance and college graduation. Thus, personal characteristics explain almost none of the difference in attainment between rural and non-rural high school seniors. However, many individual characteristics are important in determining the likelihood of college graduation, regardless of where the student attended high school. In fact, 11 of the 13 personal characteristics included in this study are significant predictors of college completion. Changing high schools has a significantly negative effect on the odds of graduating from college with a B.A. degree. Standardized math scores and math and science units are positive predictors of finishing college. The payoffs of sports and club involvement and extracurricular hours in high school continue to pay off in college by increasing the likelihood of college completion.

The effects of religion produce mixed results in regards to Bachelor's degree attainment. Students who consider themselves to be very religious are more likely to finish college; however, students who attend church more often are less likely to attain a B.A. degree. Race and sex are also significant predictors of whether or not a student earns a B.A. degree. Members of disadvantaged races are less likely to complete college than are Asians and Whites. Women are much more likely than men to complete college. The combined effects of rural high school attendance and the individual characteristics explain 47.3% of the variation in whether or not a student graduates from college.

Model 5 presents the results of all the predictor variables upon the likelihood of finishing college with a B.A. degree. In the full model there is a residual significant difference in educational attainment between rural and non-rural high school seniors: rural seniors have a 14% less likelihood of receiving a B.A. than non-rural seniors. Those who attend rural high schools are less likely to graduate with a B.A. degree. Overall, rural high school attendance as well as school, family, and individual characteristics explain 56% of the variance in determining the likelihood of obtaining a college degree. While seven school variables were significant predictors in Model 2, only four school variables are significant in the full model. Among these are private school, percent enrolled in college prep, and percent college enrolled. In addition, school climate, which was not significant in the earlier model, becomes positively significant at the .05 level once all variables are included in the analysis.

In contrast with the school characteristics, many family characteristics are significant in the full model. Total income, parental education, parental expectations, and home educational resources all remain positively significant in the complete model. The negative effect of number of siblings more than doubles in strength in Model 5.

Individual characteristics also retain much of their significance in the full model. Although the log-odds of standardized math scores and science and math units decrease slightly between model 4 and the full model, all three remain significant. Furthermore, sports involvement, club involvement, and extracurricular hours each remain nearly as strong in Model 5 as in Model 4. Religiosity remains a positive predictor of college completion; however church attendance falls to non-significance. Changing high schools and belonging to a disadvantaged minority race each decrease the likelihood of graduating from

college with a B.A. degree. In regards to gender, females are at an educational advantage over males.

The previous tables have presented the effects of school, family, and individual characteristics upon whether a student attends college and graduates from college. This analysis can be taken a step farther in order to develop a more comprehensive understanding of the effect of rural schooling upon post-secondary outcomes. This can be accomplished by examining whether certain school, family, and personal characteristics have a more pronounced effect for rural high school students that for non-rural students. Consequently, Table 5 reports the log-odds of each predictor variable while differentiating between the rural and non-rural student samples.

How Do the Rural and Non-Rural Samples Compare?

Each pair of columns in Table 5 contrasts the different effects of the predictor variables between rural and non-rural high school seniors. These results help us to see the significant differences between the two groups.[1] In regards to school characteristics, attending a high school where the percent college enrolled is higher than the national average very significantly increases the likelihood of attending college for rural and non-rural students alike. For non-rural students there are two other school characteristics that are important. Attending a private school or a school with a higher than average percentage of disadvantaged minorities increases the odds of attending college for urban/suburban students. These effects are not significant for rural high school seniors, but neither is there a significant

1 The formula for detecting significant differences between the log-odds coefficients of the rural and non-rural groups is : t value = $b_1 - b_2 / (SE_{b1}^2 + SE_{b2}^2)^{0.5}$, where b_1 is the log-odds coefficient of the rural group and b_2 is the log-odds coefficient of the non-rural group.

Table 5. Comparison of Rural and Non-Rural Samples by School, Family, and Individual Characteristics.

	Ever Attended Four-Year College		B.A. Degree or Higher	
Variable	Rural	Non-Rural	Rural	Non-Rural
Constant	-12.534(1.26) ***b	-9.310(.855) ***	-12.063(1.51) ***	-12.331(1.04)
School Characteristics				
Private School	.857(.445)	.640(.125) ***	.472(.347)	.282(.103)
% Disadvantaged Minority	-.002(.003)	.003(.002) *	-.003(.003)	.001(.002)
% Free/Reduced Lunch	.003(.003)	.000(.002)	.004(.003)	-.001(.002
% Single Parent Homes	.082(.070)	-.013(.047)	-.056(.080)	-.055(.046)
% Enrolled in AP Courses	-.002(.003)	.001(.002)	-.004(.003) a	.002(.002)
% Enrolled in College Prep	-.004(.003)	.001(.002)	.002(.003)	.003(.002)
% College Enrolled	.270(.065) ***	.238(.043) ***	.152(.070) *	.171(.042)
School Climate	.135(.150)	.036(.100)	.144(.168)	.155(.103)
Daily Attendence Rate	-.004(.009)	-.002(.007)	-.010(.011)	.007(.008)
Family Characteristics				
Total Income	.059(.023) *b	.073(.017) ***	.098(.028) ***	.087(.018)
Parental Education				
HS Grad or GED	.482(.189) *	.154(.132)	.471(.278)	.016(.168)
Some College	.519(.179) **	.413(.121) ***	.499(.266)	.253(.154)
College Grad	1.026(.232) **a	1.025(.150) ***	.942(.297) ***	.745(.170)
M.A. or Higher	1.565(.294) ***b	1.381(.176) ***	1.336(.320) ***	1.088(.179)
Parental Expectations				
Votech/Business School	1.031(.478) *	.266(.302)	-1.032(.952)	.577(.624)
Some College	2.037(.471) ***b	.859(.293) **	1.212(.780)	1.030(.597)
College Grad	2.656(.452) ***	1.959(.268) ***	2.427(.744) ***	2.605(.559)
M.A. or Higher	3.189(.456) ***	2.357(.271) ***	2.624(.746) ***	2.923(.560)
Home Ed. Resources	.234(.048) ***b	.068(.032) *	.124(.055) *	.026(.034)
Cultural Capital	.041(.050)	-.013(.035)	-.034(.057)	.023(.036)
# Siblings	-.013(.040)	-.043(.028)	-.011(.047)	-.073(.030)
Individual Characteristics				
Cumulative GPA	-.001(.002)	.002(.001)	-.002(.002)	.000(.001)
# School Changes	-.351(.094) ***	-.404(.059) ***	-.276(.118) *	-.343(.072)
Science Units	.566(.055) ***	.575(.040) ***	.434(.058) ***	.494(.039)
Math Units	.636(.129) ***	.807(.084) ***	.792(.103) ***b	.504(.058)
Standardized Science	.011(.008)	-.007(.006)	.001(.009)	-.010(.006)
Standardized Math	.063(.009) ***	.058(.007) ***	.058(.011) ***	.062(.007)
Sports Involvement	.299(.081) ***b	-.057(.059)	.259(.083) **b	.059(.055)
Club Involvement	.128(.033) ***	.111(.023) ***	.138(.034) ***	.124(.022)
Extracurricular Hours	.065(.034) b	.176(.023) ***	.113(.037) **	.117(.022)
Is R Religious?	.165(.101)	.106(.067)	.397(.110) ***	.193(.065)
Church Attendence	-.063(.036)	-.010(.025)	-.049(.041)	-.021(.025)
Disadvantaged Race	.104(.140) a	-.219(.083) **	-.153(.172)	-.454(.091)
Female	.320(.097) ***a	.126(.066)	.495(.109) ***	.515(.067)
Model X^2 (df)	2006.256(34) ***	4326.062(34) ***	1699.715(34) ***	4141.728(34)
Nagelkerke R^2	0.567	0.569	0.547	0.556
N	3633	7909	3602	7481

*p<05, **p<.01, ***p<.001

a Difference between rural coefficient and non-rural coefficient is significant at the .10 level.

b Difference between rural coefficient and non-rural coefficient is significant at the .05 level.

difference between the effects on rural versus non-rural students. The correct interpretation of these seemingly anomalous results is that the effect in the non-rural sample reveals far less variation than in the rural sample.

In regards to family characteristics, income is significant for both rural and non-rural students. However, the difference between the rural and non-rural coefficients is significant at the .05 level, with income having a larger effect with respect to urban/suburban students. The effects of parental education upon attending a four-year college are sometimes greater for rural high school students. Parents who are college graduates or who have post baccalaureate degrees disproportionately improve the likelihood that a rural high school senior will attend a four-year college. Parental expectations exert a similar, disproportionate influence on college attendance by rural students. The expectation of some college greatly improves the likelihood of rural students attending a four-year institution. While home educational resources are beneficial for both rural and non-rural students, they prove to be significantly more advantageous for rural high school students.

Many of the effects of the individual characteristics displayed in the first pair of columns have a statistically equal effect upon students from rural and non-rural high schools. For instance, changing high schools negatively influences the odds that rural and non-rural students will attend a four-year college. Furthermore, science units, math units, standardized math scores, and involvement in clubs all positively increase the likelihood of college attendance regardless of high school location. On the other hand, there are several personal characteristics that vary greatly depending on high school location. Being involved in sports and being female are only advantageous for students attending rural high schools.

Conversely, devoting time to extracurricular activities is only advantageous to urban/suburban high school students. While being a member of a disadvantaged race has a significantly negative effect for urban/suburban students regarding college entrance, it appears to have no such effect on rural high school students. School, family, and individual characteristics explain 57% of the variation in college entrance for rural students as well as for non-rural students.

The last two columns of results in Table 5 display the effects of the predictor variables upon graduating with a Bachelor's degree or higher for rural and non-rural students. As we saw in the previous comparisons, the effect of a few school characteristics reveal less variation and thus greater significance for non-rural compared to rural students. This holds for private school, percent college prep, and percent college enrolled. Attending a private high school or a high school with a greater than average enrollment in college prep and greater than average college enrolled significantly benefits non-rural students in terms of college graduation. Percent enrolled in AP courses has a negative effect for rural students and a positive effect for non-rural students. Although neither effect is statistically significant, the difference between the rural and non-rural coefficients is significant at the .10 level.

Family characteristics have similar effects among rural and non-rural high school students in regards to graduating from college with a B.A. degree. For instance, income significantly predicts college completion for students regardless of location. Students from both rural and non-rural high schools are also more likely to graduate from college if their parents obtained at least a college degree. A similar trend is displayed by the effects of

parental expectations. Rural and non-rural students are more likely to graduate college if their parents expect them to obtain at least a B.A. degree or higher. Home educational resources prove to be modestly advantageous for rural high school students only. On the other hand, having a large number of siblings only has a significant negative influence on students who attended non-rural high schools.

Individual characteristics appear to play a sizeable role in raising the likelihood of completing college for both rural and non-rural high school students, with only two of the effects revealing significant rural/non-rural differences. Changing schools has a negative impact on college graduation for students from both locations. Specifically, with a log-odds of -.276, the impact of changing high schools is significant at the .05 level for rural high school students. With a log-odds of -3.43, the impact of changing schools is significant at the .001 level for non-rural students. Science units and standardized math scores have an approximately equivalent positive effect for both rural and non-rural high school students. The effect of math units on graduating with a Bachelor's degree is also significantly positive; however, the effect is significantly greater for rural students. Being involved in sports proves to be advantageous for rural students, but has no significant effect on non-rural students. On the other hand, club involvement and extracurricular hours prove to be positive predictors of college completion for both rural and non-rural high school students. Identifying oneself as religious proves to be advantageous for students regardless of location, although the effect is twice as great for students attending rural high schools. Belonging to a disadvantaged race only proves to be a hindrance to urban/suburban students, while having no such significant effect upon rural students. Lastly, females from both rural and non-rural areas are

significantly more likely to graduate college with a B.A. degree than are males regardless of high school location. Cumulative GPA, standardized science scores, and church attendance are the only personal factors that fail to have a significant effect on college graduation for students of either locality. Overall, the school, family, and individual characteristics explain approximately 55% of the variation in college completion for rural high school students and 56% for non-rural students.

Discussion

The logistic regression models produced a plethora of results regarding the effects of rural high school attendance as well as school, family, and individual characteristics upon postsecondary outcomes. Careful interpretation of these results will help to uncover which factors are important in the pursuit of academic success after high school and whether these effects vary by location. The goal of this section is to examine whether the findings from the present study coincide or contrast with findings from previous research. Consequently, each postsecondary outcome included in this study, attending a four-year college and graduating with a B.A. degree, will be analyzed in relation to past findings.

Attending a Four-Year College

The present study has confirmed many previous research findings, but has also produced a number of unexpected outcomes. First, examining the full model in Table 3 produces valuable findings regarding which school, family, and individual characteristics have a significant impact on the likelihood of attending a four-year college institution. Table 5 disaggregates the impact of the school, family, and individual characteristics by rural versus non-rural high schools. This step helps us assess whether the processes described are

parallel, or whether the educational return to resources and investments varies by context (Roscigno and Crowley 2001). The first two columns in Table 5 display whether effects are significant in rural high schools, non-rural high schools, or both. In line with previous research, students attending private high schools are significantly more likely to attend college than are public high school students (Lee et al. 1997; Sander 2001). However, the results of this study show that the advantage of attending a private school is only advantageous for students attending a private high school located in urban/suburban areas.

The percentage of disadvantaged minorities in a school does not show up as an important predictor of college entrance in Table 3. However, in Table 5 we see that this is because this variable has opposite effects in the context of rural and non-rural schools. While having a higher than average percentage of disadvantaged minorities in one's high school significantly increases the likelihood of college attendance for non-rural students, it does not significantly affect the odds of attendance for rural high school seniors. The effects cancel each other out and produce an overall effect that is non-significant. In agreement with Khattri et al. (1997), this study has found that schools with a higher than average percentage of students enrolled in college prep are more likely to attend college. This finding is very significant and does not vary between students in rural and non-rural high schools. Overall, the school characteristics included in this study show a very limited influence upon the likelihood of a high school senior attending a four-year college, regardless of a high school's location.

On the other hand, family characteristics play a more important role in predicting the likelihood of college attendance. Total income has a positive effect as previous research has

indicated. Although family income benefits rural and non-rural students alike, its effect is significantly greater on students in urban/suburban high schools. This finding was not expected, and the explanation for it is unclear. Possibly rural students are more likely to attend four-year institutions that have liberal financial aid programs. Having parents who possess a high school degree or higher increases the likelihood that a student will enter college compared to students whose parents did not finish high school. Although parental education is beneficial to students from all high schools, it is particularly advantageous to rural high school students. For instance, having parents who hold a college B.A. degree or higher makes rural students more likely to attend college than urban/suburban students whose parents possess the same education.

A similar trend is observed when examining the impact of parental expectations. Parental expectations increase the odds of college entrance for all students, although parental expectations have a greater influence on students who attend rural high schools. The highly positive effects of family SES on educational outcomes found in the present study compliment previous research, which has found that parental income, education, and expectations serve to increase the educational achievement and attainment of their children (Israel et al. 2001; Roscigno and Crowley 2001; Teachman et al. 1997). The amount of home educational resources is also valuable in regards to college entrance. Interestingly, while home educational resources benefit all students, they are nearly three times more effective for rural than for non-rural high school seniors. This finding has not been brought to light in previous research and suggests that an enriched home environment in rural areas may compensate for the deficiencies that Roscigno and Crowley (2001), amongst others,

have noted about rural communities. Cultural capital and number of siblings, cited respectively by Aschaffenburg and Maas (1997) and by Coleman (1988) as factors that influence education, were not found to influence college attendance.

Individual characteristics also contribute heavily in determining whether or not a student will attend a four-year college. Falling in line with previous research (Alexander et al. 1997; Coleman 1990; Israel et al. 2001; Teachman et al. 1997), number of school changes has a significantly negative effect upon college entrance. Changing high schools serves as a disadvantage for students in rural and non-rural areas alike. More units taken in science and math, as well as higher standardized math scores, increase the likelihood that a student will attend college. These findings are significant at the .001 level for rural and non-rural students. Standardized science scores fail to play a role in regards to college entrance. In a previous study McNeal (1995) proposed that involvement in sports and clubs helps to integrate students into their high school in an academic sense; thus, increasing high school achievement. These results are taken a step further in the present study analyzing the impact of sports and club involvement on whether or not a student attends a four-year college. According to the full model outcome in Table 3, involvement in sports fails to have a significant effect upon college entrance. However, a closer examination reveals that this result is due to the offsetting effects between attending rural and non-rural high schools. Sports involvement in a rural school increases the odds of attending college at the highest significance level; however, sports involvement has a negative, insignificant effect upon non-rural students. The opposite is true in regards to the number of hours spent on extracurricular activities. Extracurricular hours are a significant predictor for urban/suburban students, but

not for rural students. Involvement in clubs positively increases the odds of college enrollment for all students regardless of high school location. Being highly religious offers a moderate benefit to high school students who wish to pursue a post-secondary education. Level of religiosity is not significant for either rural or non-rural high school seniors in Table 5, nor is it significant for the sample taken as a whole (Table 3). Although being a member of a disadvantaged race has no significant effect on high school students overall, it does lower the odds of attending college for non-rural students. Females from rural high schools are more likely to attend a four-year college than are their male counterparts, and are also more likely to attend than their female counterparts in urban/suburban locations. These striking findings may indicate important labor market differences in rural and non-rural areas. In conclusion, family and individual characteristics play a role in determining the likelihood of college attendance, while school characteristics fail to carry much weight.

Receiving a Bachelor's Degree

Almost half of the school characteristics included in this study are significant in terms of college graduation (Table 4). Students who attend a private high school are significantly more likely to graduate college with a B.A. degree than are students who attend public high schools. However, this advantage of attending a private high school is only beneficial to urban/suburban students. Combining the findings in the first four columns of Table 5 reveals that students who attend a private high school are more likely to attend as well as graduate from college, but only if their high school was located in a suburban/urban area. Next, students from high schools with a higher than average percentage enrolled in college prep have an increased chance of finishing college. However, this effect is also confined solely to

students attending urban/suburban high schools. Hailing from a high school with a higher than average percentage of students who are college enrolled also increases the likelihood of college completion. This effect is significant for students from both rural and non-rural high schools. In a review of past academic research, Khattri and his colleagues (1997) found that attending a high school with a high amount of behavioral problems increases the risk for educational failure. The present study supports this conclusion by finding that students who attend a high school with a positive school climate have an increased likelihood of graduating from college with a B.A. degree.

Family characteristics seem to be equally beneficial to students from rural and non-rural high schools with respect to graduating from college. For instance, whereas total family income was a greater predictor of attending a four-year college for urban/suburban students, family income offers an equivalent positive effect to all students in terms of receiving a college B.A. degree. As Table 5 reveals, parental education and parental expectations had a greater impact on college entrance for rural students than for non-rural students. However, when it comes to graduating college, parental education and parental expectations have a similar effect upon students from both rural and non-rural high schools. The highly positive effects of family SES on educational outcomes found in the present study compliment previous research, which has found that parental income, education, and expectations serve to increase the educational achievement and attainment of their children (Israel et al. 2001; Roscigno and Crowley 2001; Teachman et al. 1997). Only home educational resources and number of siblings have differential effects between rural and non-rural students. Having a high number of home educational resources increases the likelihood of graduating college for

rural students, but has no such effect for urban/suburban students. Again, this may indicate that educational resources at home compensate for the lesser resources of the rural community. Having a large number of siblings has no educational effect for rural students, but reduces the opportunity to graduate from college among non-rural students. This finding poses an important qualification to the claim made by Coleman (1988) and Teachman et al. (1997) that siblings dilute the financial and social capital within the family.

Eleven of the thirteen personal characteristics included in this study are significant predictors of graduating from college with a B.A. degree. Changing high schools has a negative effect on completing college for rural and non-rural students alike. This finding falls in line with past research, which has consistently shown that changing schools has harmful effects in terms of education (Alexander et al. 1997; Coleman 1990; Israel et al. 2001; Teachman 1997). The most plausible explanation for this is that changing high schools prevents students from becoming integrated into a stable learning environment. Completing more science and math units in high school increases the likelihood of graduating college for both rural and non-rural students. However, taking math units offers much more of an educational advantage in terms of college attainment for rural high school students than for non-rural students. This is evidenced by the difference between the rural and non-rural coefficients, which is significant at the .05 level. While standardized science scores are insignificant predictors of college graduation, standardized math scores are important for students from all high schools. Possibly, this indicates that math achievement is a good overall indicator of the likelihood of postsecondary educational success.

Involvement in high school sports has no significant effect upon college entrance, but it does significantly increase the odds of graduating from college with a B.A. degree. However, this involvement in sports is only beneficial for students attending rural high schools, another unexpected finding that deserves further study. On the other hand, club involvement and hours spent on extracurricular activities increase the odds of college graduation for all students. Being very religious during high school is also advantageous in terms of postsecondary attainment for both rural and non-rural students. This is an interesting finding considering that previous research has seen being very religious as a deterrent to achieving a college education (Darnell and Sherkat 1997). While being a member of a disadvantaged race has no educational effect for students in rural high schools, racial minorities in urban/suburban schools are less likely to graduate with a B.A. degree than are whites and Asians. The differential effects of high school location on the higher educational attainment of students from different racial backgrounds have not been found previously in the research literature. Lastly, females in all high schools are more likely to finish college than are their male counterparts. This may be an indication of job opportunity differentials for males and females that require a college diploma. For instance, women are more likely to seek employment in allied health and educational fields that require at least a Bachelor's degree.

Conclusions

This study has examined the effects of rural high school attendance as well as other school, family, and individual characteristics upon postsecondary educational outcomes. This has resulted in a number of interesting and useful findings in regards to determining

student academic success. Most importantly, the long-term effects of receiving a rural high school education are not nearly as detrimental as some previous research has suggested, although there is clearly some evidence of disadvantage.

What this study also reveals is that, while attending a rural high school does make students less likely to enter and complete college, the disadvantage of rural high school can be overcome. This is accomplished by the strong effects of certain school, family, and individual characteristics upon postsecondary educational attainment.

Perhaps the most influential factor in alleviating the potential disadvantages faced by rural high school students is a supportive home environment. The family characteristics included in this study have been shown to reduce the considerable discrepancies between rural and non-rural high school students. For example, family income, parental education, and parental expectations are crucial factors for ensuring that rural high school students enter and graduate from college at the same rate as urban/suburban students. This reaffirms the findings of Israel and his colleagues (2001) that families play a key role in promoting their children's academic success. Promoting a supportive home environment where parents place a high value on their children's education is especially advantageous for rural high school students in terms of postsecondary educational success. Interestingly, home educational resources increase the likelihood of college attendance for rural high school seniors at three times the rate of non-rural seniors. Rural families whose homes contain plenty of educational resources, such as a place to study, an encyclopedia, a dictionary, and a computer, have an increased likelihood of seeing their children attend and graduate from

college. Thus, a supportive home environment can be extremely effective in overcoming any disadvantages that may result from receiving a rural high school education.

This study shows that family and individual characteristics are more influential than school characteristics in determining who will attend as well as graduate from college. Family SES proves to significantly increase the likelihood of attending and completing college for all students, regardless of high school location. But there are also conscious investments that parents can make to improve higher educational opportunity for their children, such as having high expectations and furnishing their homes with educational resources. Furthermore, individual characteristics account for nearly half of the variation in determining which students will enter a four-year college and graduate with a B.A. degree. Involvement in extracurricular activities and organizations significantly increases the odds of postsecondary educational success.

While family SES has clear implications for postsecondary educational opportunities, there are also effects related to race and gender. Being a member of a minority race poses a significant disadvantage to urban/suburban high school students. Disadvantaged minorities from urban/suburban high schools are less likely to attend and complete college than are their white and Asian counterparts. On the other hand, being female poses a distinct advantage in terms of postsecondary success. Females from rural and non-rural high school locations are more likely to attend a four-year college and are more likely to graduate with a B.A. degree than are males.

The present study has produced important findings regarding postsecondary outcomes, but has also uncovered numerous topics for future research. While this study

focused specifically on educational outcomes in four-year colleges, attention should be given to students who attend alternative postsecondary institutions, such as community colleges and vocational schools. It would be useful to uncover the effect that attending a rural high school may have on entering as well as graduating from two-year institutions and also on matriculating from a two-year to a four-year institution. This poses another area for consideration, whether the opportunity to enroll in two-year institutions discourages rural high school students from attending four-year colleges. Perhaps rural seniors are more likely to attend smaller two-year colleges that may be more available in remote rural areas. Furthermore, high school students living in extremely remote rural areas may be deprived of the ability to attend any type of educational institution after high school.

Future study of postsecondary outcomes should also pay close attention to whether a student enrolls in a public versus a private college. Access to private colleges may be limited for students from rural high schools due to financial constraints. Thus, SES and perhaps even race and gender will likely play a vital role in determining which students have the ability to pursue a high quality education at a private institution. A more detailed study that addresses the effects of SES, race, and gender upon access to two-year versus four-year colleges as well as public versus private institutions, would greatly enhance our understanding of postsecondary educational outcomes.

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APPENDIX

Names of my variables are capitalized. Names of NELS source variables are shown in parentheses. Missing values for all Independent variables except for 'Rural High School Attendance' and 'Female' have been recoded with the mean value.

DEPENDENT VARIABLES

1. ATTEND COLLEGE: asks whether respondent ever attended a four-year college institution after high school. Recoded (0) no, (1) yes (F4ATT4YR).

2. B.A. DEGREE: indicates whether by 2000 the respondent earned at least a Bachelor's degree. Recoded (0) no, (1) yes (F4HHDG).

INDEPENDENT VARIABLES

1. RURAL HIGH SCHOOL ATTENDANCE: recoded to classify respondent's second follow-up school district as (0) suburban/urban or (1) rural (G12URBN3).

School Factors

1. PRIVATE SCHOOL: recoded to classify respondent's school as public (0) or (1) private (G12CTRL1).

2. % DISADVANTAGED MINORITY: measures the percentage of disadvantaged minority students in the school. Disadvantaged minorities include African-Americans, Hispanics, and Native Americans
   (F2C22A-E).

3. % FREE/REDUCED LUNCH: percentage of students in a school who receive free or reduced lunch (F2C25A).

4. % SINGLE PARENT HOMES: percentage of 12^{th} grade students in single parent homes (F2C23). 1= 0 to 10% 2= 11% to 24% 3= 25% to 49% 4= 50% to 74% 5= 75% to 100%

5. % ENROLLED IN AP COURSES: the number of twelfth grade students enrolled in AP classes divided by the twelfth grade enrollment composite. Missing values are recoded to the mean. (F2C49, F2C2).

6. % ENROLLED IN COLLEGE PREP: percentage of twelfth grade students enrolled in college prep (F2C7B).

7. % COLLEGE ENROLLED: percentage of 1990-91 high school graduates who are now attending a four-year college. Values are centered on midpoints of the categories (F2C27B).

8. SCHOOL CLIMATE: an index created to determine the school climate in In terms of behavioral problems ranging from 1= Serious 2= Moderate 3= Minor 4=Not a problem (F2C57A-P).

9. DAILY ATTENDANCE RATE: indicates the school's average daily attendance rate (F2C21).

Family Resource Variables

1. TOTAL INCOME: total family income from all sources in 1991, values centered on midpoints of the categories. (F2P74)

1= None	6= 7,500 to 9,999	11= 35,000 to 49,999
2= Less than 1,000	7= 10,000 to 14,999	12= 50,000 to 74,999
3= 1,000 to 2,999	8= 15,000 to 19,999	13= 75,000 to 99,999
4= 3,000 to 4,999	9= 20,000 to 24,999	14= 100,000 to 199,999
5= 5,000 to 7,499	10= 25,000 to 34,999	15= 200,000 or higher

2. PARENTAL EDUCATION: measures parent's highest education level. Recoded into categories:(1) Less than High School, (2) High School Grad or GED, (3) Some College, (4) College Grad, or (5) M.A. or Higher (F2PARED)

3. PARENTAL EXPECTATIONS: asks parents how far in school they want their teen to go. Recoded into categories:(1) High School or less, (2) Votech or Business School, (3) Some College, (4) College Grad, or (5) M.A. or Higher. (F2P61)

4. HOME RESOURCES: an index ranging from 0 to 6 created to determine the number of educational resources in the respondent's home. Educational resources include: a place to study, an encyclopedia, a dictionary, a computer, more than 50 books, and a calculator. (F2N12A,D,F,H,M,O)

5. CULTURAL CAPITAL: measures how often parents attended concerts, plays, and movies with their teen in the last year. 1=never, 2=rarely, 3=sometimes, 4=frequently. (F2P50C)

6. # SIBLINGS: number of siblings living in the respondent's home. (BYP3B)

Individual Variables

1. GPA: cumulative grade point average for last year of school attended. (F2RGPA)

2. # SCHOOL CHANGES: measure of the number of times that respondent has changed schools in the last four years. (F2P33)

3. SCIENCE UNITS: measures total units taken in science during high school. (F2RSCI_C)

4. MATH UNITS: sum of total units taken in advanced math courses during high school. (F2RTRI_C, F2RPRE_C, F2RCAL_C)

5. STANDARDIZED SCIENCE: twelfth grade standardized science test score. (F22XSSTD)

6. STANDARDIZED MATH: twelfth grade standardized math test score. (F22XMSTD)

7. SPORTS INVOLVEMENT: student was member of an individual sport, team sport, or involved in cheerleading. No (0), Yes (1). (F2S30AA-AC).

8. CLUB INVOLVEMENT: sum of all other school activities and clubs in which the respondent participated. (F2S30BA-BK).

9. EXTRACURRICULAR HOURS: records the amount of hours per week spent on extracurricular activities. (F2S31) 0= 0 1= Less than 1
   2= 1-4 3= 5-9 4= 10-14 5= 15-19 6= 20 or more

10. IS R RELIGIOUS?: does the respondent think of him or herself as a religious person? 1=no, 2=somewhat, 3=very. (F2S105)

11. CHURCH ATTENDANCE: recoded to indicate how many times the respondent attended church services in the past year. (F2S106)
    1= None 3= Once a month 5= Once a week
    2= Several times 4= 2 to 3 times a month 6= More than once a week

12. DISADVANTAGED RACE: indicates whether the respondent belongs to a disadvantaged race. Recoded (0) for Asian or Non-Hispanic White;

(1) for Black, Hispanic, or American Indian. (F2RACE1)

13. FEMALE: indicates the respondent's gender. (1) Male, (2) Female. (F2SEX)